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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|--------------------------|-------------|----------------------|---------------------|------------------|
| 09/483,737 | 01/14/2000 | Hansjorg Reichert | GR-97-P-1903 | 8769 |
| 24131 | 7590 | 01/12/2005 | EXAMINER | |
| LERNER AND GREENBERG, PA | | | SEFER, AHMED N | |
| P O BOX 2480 | | | ART UNIT | PAPER NUMBER |
| HOLLYWOOD, FL 33022-2480 | | | 2826 | |

DATE MAILED: 01/12/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/483,737

Applicant(s)

REICHERT ET AL.

Examiner

A. Sefer

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 October 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,9,10 and 15 is/are pending in the application.
- 4a) Of the above claim(s) 1,9 and 10 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 15 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date <u>7/2004</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

1. The amendment filed 10/29/04 has been entered. Claims 2-8 have been cancelled; no new claims have been introduced.

Claim Objections

2. Claim 15 is objected to because of the following informalities: The recitation “using said solder to form a chip-substrate connection by said solder” appears to be redundant. Appropriate correction is required.
3. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yamagishi (“Yamagishi”) (JP 6-291239) (of record) in view of Ishii (JP 6-326210) (of record), Bacon Bacon et al. (“Bacon”) USPN 5,234,153.

Yamagishi discloses in fig. 1c a solder containing at least two components with at least two constituents including a first constituent containing a precious metal and a second constituent being consumed during a soldering operation by one of reacting and being dissolved in material which are to be joined; a substrate 1; and a semiconductor chip 4 secured to said substrate by one of alloying and brazing using said solder, but do not teach a hypereutectic composition of Au-Sn with a thickness.

Ishii discloses (see fig. 2 and attached machine translated version) a semiconductor chip 1 having a rear side and an a diffusion barrier 7a provided on said rear side; said semiconductor chip being secured at said rear side to a substrate 40 by a solder containing gold and tin solder 8 and said solder has a hypereutectic concentration containing gold-tin (AuSn) with a

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hypereutectic Sn concentration and containing a gold-tin compound (AuSn) having a composition which falls within the range recited in the claim to form a chip-substrate connection by said solder.

Bacon teaches (see col. 1 lines 50-63 and claim 7) the advantage of using a thin gold-tin compound solder.

Therefore, it would have been obvious to one skilled in the art at the time the invention was made to replace Yamagishi's Au-Sn eutectic alloy of with Ishii's hypereutectic Sn concentration, since that would prevent deformation thereby enhancing the mechanical strength of a semiconductor chip connection to a substrate. It would have been obvious to form a layer with a thickness of 1 μm to 2 μm , since that would provide a better thermal conductance as taught by Bacon.

Response to Arguments

4. Applicant's arguments with respect to claim 15 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

5. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period

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will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to A. Sefer whose telephone number is (571) 272-1921.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nathan Flynn can be reached on (571) 272-1915.

NATHAN J. FLYNN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

ANS
January 9, 2005